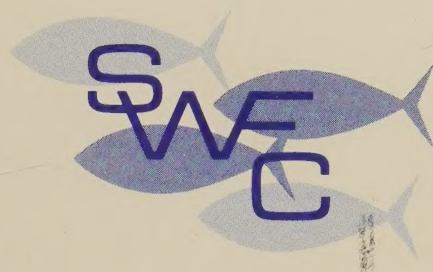




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SOUTHWEST FISHERIES CENTER

JUL 16 1984

MONTHLY REPORT - MAY 1984

National Marine Fisheries Service
2570 Dole Street
Honolulu, Hawaii

TABLE OF CONTENTS

PUBLICATIONS

HONOLULU LABORATORY

Spiny Lobster Escape Vent Experiment Modified.	1
Intravascular Parasite Discovered in Yellowfin Tuna.	4

LA JOLLA LABORATORY

Research Plan Slowed for Groundfish in California.	5
Chromosomal Analysis Completed for Albacore, Yellowfin, and Skipjack Tuna	6

PACIFIC ENVIRONMENTAL GROUP

Ocean Climatology and Monitoring.	9
---	---

TIBURON LABORATORY

Computer Program Developed to Aid Determination of Juvenile Abundance.	24
---	----

FISHERIES INFORMATION SYSTEMS & ADP

PACFIN Update.	26
------------------------	----

ADMINISTRATIVE ACTIVITIES

Update on A-76 Review	27
---------------------------------	----

MISCELLANEOUS

Honors, Awards, Seminars, Public Affairs, Visitors, Meetings and Travel, and Personnel	29
---	----



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SOUTHWEST FISHERIES CENTER

MONTHLY REPORT - MAY 1984

Status of Publications

Published

Alcorn, Doris J. 1984. The Hawaiian monk seal on Laysan Island: 1982. U.S. Dep. Commer., NOAA Tech. Memo. NMFS, NOAA-TM-NMFS-SWFC 42, 37 p.

A 3-1/2 month observational study of the endangered Hawaiian monk seal, *Monachus schauinslandi*, was conducted on Laysan Island from 15 March to 30 June, and an additional census was conducted on 10 July 1982. Monk seals were identified by natural markings and scars, and an identification file including sketches and photographs was established. A census was conducted approximately every 2 days. Reproduction, injuries, and mortalities were monitored, and scats, spews, and net flotsam were collected.

Total beach counts, excluding pups, ranged from 66 to 119 and averaged 90 seals. Thirty pups were born, and the average lactation period (for 16 mothers) was 39.4 days.

Five seals died, two of which were nursing pups. At least nine injuries occurred, two of which were serious. Three nonfatal entanglements in debris were seen, and 26 net and rope fragments capable of entangling seals were found and sampled.

Collections were made of 40 parasitic scat samples, 210 scats, 7 spews, and specimens from 3 necropsies.

Three observations not previously reported for Hawaiian monk seals were: 1) sharks killed and consumed a monk seal, 2) a pup suckled on its natural mother and a foster mother long enough to comprise a total nursing period twice the normal period, and 3) interatoll movement of an adult female was recorded wherein she pupped on Laysan and moved to Lisianski Island to molt.

MacCall, Alec D., Keith R. Parker, Ronald Leithiser, and Bill Jessee. 1983. Power plant impact assessment: A simple fishery production model approach. Fish. Bull., U.S. 81(3):613-619.

The relative abundance of a cohort affected by power plant entrainment mortality as a fraction (R_C) of the abundance of that

cohort in the absence of power plant impact can be calculated by $R_C = \exp(-E_i t_i)$ where t_i is the duration of life stage i , and E_i is the entrainment mortality rate at stage i . Rate E_i can be estimated by the ratio of nonsurviving entrained organisms during a given time interval. An estimate of adult abundance allows calculation of equivalent adult losses. When insufficient information is available to determine the long-term effect on the population, the fishery "potential yield" formula provides an interim estimate. Relative equilibrium abundance of the affected population (R_C) is approximated by $R_e = 1 - (\sum E_i t_i + F_p + F_f)/2M$, where F_p is adult mortality rate due to power plant impingement, F_f is adult mortality rate due to fisheries, and M is adult natural mortality rate. As in the case of the "potential yield" formula, this approximation of long-term equilibrium impact should be discarded when better estimates can be developed.

Approved by Center Director

Barrett, Izadore. Fisheries management in the U.S. fishery conservation zone. For publication in the 4th week of Fisheries.

Coe, James M., David B. Holts and Richard W. Butler. The "tuna-porpoise" problem: NMFS mortality reduction research 1970-1981. For consideration for publication in Marine Fisheries Review.

Hewitt, Roger P. Production, survival and dispersal of young northern anchovy (*Engraulis mordax*): evidence for the regulation of population size. For consideration for publication in Ecology.

Laur, R. Michael and John T. Brucks. Living marine resources applications - Chapter 13. For publication in the Advances in Geophysics.

Pitman, Robert L. The marine birds of Alijos Rocks, Mexico. For consideration for publication in the Journal of Western Birds.

Wahlen, Bruce E. and Tim Smith. Observer effect on incidental dolphin mortality in the eastern tropical Pacific tuna fishery. For consideration for publication in Fishery Bulletin, U.S.

Administrative Reports

Hawaii Opinion, Inc. 1984. A summary of the survey. A cost earnings study of the longline and handline fishing fleets in Hawaii. SWFC Admin. Rep. H-84-7C.

Skillman, R.A., J.C. Cooper, and D.R. Locey. 1984. Inventory of U.S. vessels in the central and western Pacific. Phase I--Summary of public record. SWFC Admin. Rep. H-84-8.

Translation

Bito, Masamichi. 1983. Burnt tuna (Maguro no yake niku). Sakana, Tokai Reg. Fish. Res. Lab. 31:56. (Engl. transl. by T. Otsu, 1984, 2 p., Transl. No. 92; available Southwest Fisheries Cent., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96812.)

HONOLULU LABORATORY

Insular Resources Investigation

Field Work Completed in the Mariana Archipelago

Dr. Jeffrey P. Polovina, Leader, Resource Assessment Investigation of the Mariana Archipelago Program, reports that a 40-day fishery assessment cruise in the Mariana Archipelago was completed on the NOAA Ship, Townsend Cromwell, from April 7 through May 17. Experimental fishing for snappers and groupers, deepwater shrimps, and akule was conducted at Esmeralda Bank, Pathfinder Bank, Farallon de Medinilla, Rota Island, Guam, Pagan Island, Alamagan Island, and an unnamed bank 120 nautical miles west of Guam. The unnamed bank produced the best catch rates for snappers and groupers, and the best shrimp catches were obtained at Pagan and Alamagan Islands. The best akule catches were made at Pathfinder Bank.

This cruise is the eighth and last in a series of fishery assessment cruises conducted by the Honolulu Laboratory which began in 1982 in the Mariana Archipelago. Based on the data collected during these cruises, charts of the distribution of snappers and groupers, and deepwater shrimps in the Marianas will be prepared, and estimates will be made of the standing stock and maximum sustainable yield of these species. Estimates of important population parameters including growth and mortality of akule, snappers and groupers, and deepwater shrimps will also be obtained.

Thermal Exposure Experiments Conducted

Fishery biologist Thomas K. Kazama and research assistant Yara Lamadrid-Rose report that most of the equipment and materials for the thermal exposure experiments have arrived. The equipment was modified until a satisfactory design was achieved to run experiments on the eggs and larvae of mahimahi, Coryphaena hippurus. A complete series of experiments on developmental stages of eggs and larvae and exposure time were conducted using two different spawns and two different temperature exposures. The results indicate that the mahimahi eggs are much more sensitive to thermal shock than the larvae. Also, eggs at earlier developmental stages had noticeably higher mortalities before hatching than eggs in more advanced stages when subjected to thermal shock.

Variability in the results, including those from the controls, suggests problems with egg quality. Egg mortalities of 50-60%, yolk abnormalities, and embryo deformities were found throughout experimental and control eggs. The feeding larvae also appeared to have nutritional problems and mortalities were high throughout experimental and control samples.

Fishery Management Research Program

Spiny Lobster Escape Vent Experiment Modified

Dr. Robert A. Skillman, Leader, Fishery Management Research Program, reports that the experimental design of the spiny lobster escape vent study has been modified to include the use of the response surface statistical procedure. This procedure provides a means for more precisely estimating the escape vent size that will allow maximum escapement of sublegal spiny lobsters. This statistical procedure does not require a redesign of the preliminary laboratory trials, but does require that the field phase be modified and expanded. Skillman, statistician Gary L. Kamer and research assistant Alan R. Everson have redrafted the project documentation accordingly.

Field Station to Be Reopened in American Samoa

Because of the increasing importance of tuna purse seine landings in American Samoa, Dr. Robert Skillman reports that a field station is being reopened in Pago Pago. The field station sampler will increase the Honolulu Laboratory's monitoring activities of the tuna purse seine fishery and will collect, among other information, the size composition of the landings. Activities monitoring on the foreign longline fishery based in Pago Pago will continue.

* * * * *

Dr. Robert O. Mendelsohn, visiting Faculty Fellow in Economics, discussed his proposed research on endangered species at a seminar. His research will focus on "existence valuation," the means for specifying economic value for resources, animals, etc., which do not have market values. Mendelsohn's talk stimulated substantial discussion, especially among those involved in marine mammal research at the Laboratory and social-political-economic research at the University of Hawaii (UH) Sea Grant Program.

* * * * *

Samuel G. Pooley, Industry Economist, attended meetings of the Western Pacific Regional Fishery Management Council's bottom fish plan development team and the pelagic management unit species plan development team. Dr. Robert Skillman also attended the pelagic management meeting.

Pooley also reports that Phil Meyer of Meyer Resources, Inc., visited the Laboratory to begin design of the Hawaii Recreational Fishing Valuation study. In addition to meeting with the Laboratory staff, he and Pooley also met with people in Hawaii State agencies to develop a cooperative environment and to explore expanding the scope of the study.

* * * * *

Daniel R. Locey, NOAA Jr. Fellow, is implementing a procedure for online management of computer programs used by Program staff on the UH's mainframe computer.

Pelagic Resources Investigation

Skipjack Tuna Larvae Rearing Experiments Resumed

Thomas Kazama reports that he has obtained the first batch of skipjack tuna, *Katsuwonus pelamis*, eggs of the 1984 spawning season. The eggs were not stripped from ripe ovaries, but rather were retrieved from the holding tank 10 minutes after they had been spawned. The eggs were fertilized with sperm from a testis that was removed from a dead skipjack tuna 12 hours before. Of the approximately 80 eggs collected, 20 viable larvae were produced. One larvae is still alive after 20 days. In previous years, skipjack tuna larvae had been kept alive for a maximum of only 12 days at the Kewalo Research Facility (KRF). The larvae are being fed a mixed diet of copepods, brine shrimp, and small fish larvae.

In a related study, Andy Ayers, UH graduate student, reports that he has completed preliminary experiments and finalized plans for testing the effects of different algae diets on the biochemical composition of rotifers and copepods. The ultimate objective of this study is to determine the best algae-rotifer-copepod combination for a diet for larval fishes.

Intravascular Parasite Discovered in Yellowfin Tuna

During experiments on the cardiovascular dynamics of yellowfin tuna, *Thunnus albacares*, Dr. David Jones, University of British Columbia, and Dr. Richard W. Brill, Leader, Experimental Ecology of Tunas Program, discovered the presence of parasitic worms in the anterior portion of the dorsal aorta in yellowfin tuna. Samples of the parasites were given to Dr. James Brock, Hawaii State veterinarian, who has initially identified the parasite as a species of trematode. Brock is now attempting to identify the genus and species of the parasite.

Since the initial discovery of the intravascular parasite in February, at least a few fish from every group of yellowfin tuna delivered to the KRF have been found to be infested. The parasites, however, may be species specific

since more than 60 kawakawa, Euthynnus affinis, and 10 skipjack tuna have been examined and none were found to be infested.

Research assistant Gregory Weber will begin checking for the presence of this parasite in the large yellowfin tuna landed at the Honolulu fish auction. If significant numbers of large yellowfin tuna are found to be infested, a possible connection between the presence of parasites and "burnt tuna" may be sought.

Experiments on Magnetic Sensitivity of Tunas Continue

Dr. Michael M. Walker, Gregory Weber, and Theresa Villanueva, NOAA Jr. Fellow, have been conducting two series of experiments on the ability of tunas to detect changes in the earth's magnetic field. Kawakawa have been easily trained to swim through a hoop for a food reward. The number of passes through the hoop per unit time is used as a measure of the fish's ability to discriminate between normal and altered magnetic field conditions. However, the fish have not yet shown any ability to detect magnetic field changes.

The second series of experiments are designed to determine the minimal changes in the earth's magnetic field that can be detected by yellowfin tuna. This procedure involves the use of a mild negative reinforcement (punishment) when the fish makes an incorrect response. A flash of bright light is being tested as the negative reinforcement. Flood lights above the tank have proved to be ineffective, and tests are now being conducted with a bright underwater light.

* * * * *

Randolph K.C. Chang, Fishery Biologist, has completed initial transfer of swimming depth data from the Apple microcomputer to the Molecular super microcomputer. These data will eventually be processed in the UH Computing Center system for time series analysis and plotting on the large Zeta pen plotter.

* * * * *

Visiting scientists Jean-Michele Weber, University of British Columbia, and Dr. Hiroki Abe, Kyoritsa Women's University, have begun work on lactate metabolism and metabolism of histidine (and related dipeptides) in skipjack tuna. Their work is part of a larger project on the physiological responses of tunas to strenuous exercise.

Honolulu Laboratory Biologists Attend Tuna Conference in Hilo

Richard N. Uchida, Acting Chief, Pelagic Resources Investigation, and Dr. Richard Brill attended the Big Island Tuna Conference, which was sponsored by the County of Hawaii, UH Sea Grant Program, Big Island Aquaculture Development Committee, and the Cooperative Extension Service, on May 15-16 at the Naniloa Surf Hotel in Hilo, Hawaii. Uchida served as a panelist and reviewed the Honolulu Laboratory's ongoing research on tuna and other pelagic species, and Brill made a presentation entitled "Tuna physiology." Other topics covered at the conference were "Overview of Pacific tunas" by Witold Klawe, Inter-American Tropical Tuna Commission; "Tuna behavior and prey odor tests" by Dr. Kim Holland, UH; "El Niño and tuna" by Dr. Klaus Wyrski, UH; "Ahi burn research update" by Dr. Robert Nakamura, UH; "Big Island fishing industry concerns" by industry representatives; "New technology in fish handling and packing" by William Kowalski; and "Fishing boat loans" by Al Fong and Gary Kobashigawa for the Hawaii State Government, and Robert T.B. Iverson, Western Pacific Program Office (WPP0), Southwest Region, for the Federal Government.

* * * * *

Richard Uchida completed draft summaries in English of the six sessions convened at the "Workshop on the Environment and Resources of Seamounts in the North Pacific" and sent copies of the drafts to Dr. S. Hayasi and Dr. H. Yamanaka of the Far Seas Fisheries Research Laboratory in Shimizu, Japan, for review. Uchida also began a literature search on North Pacific net fisheries in preparation for a background paper he is planning to submit to the workshop on "Fate and Impact of Marine Debris," which is scheduled for November 26-29, 1984 in Honolulu.

LA JOLLA LABORATORY

Coastal Fisheries Resources Division

Coastal Eastern Pacific Population Biology of Fishes

International Consultation on Tuna Movements and Exchange Planned

During an international tuna workshop, which was convened by the Inter-American Tropical Tuna Commission (IATTC), participants recommended that a series of workshops be held to develop an international research program on the movement, distribution and exchange rates of tunas, key biological issues. Dr. John Hunter, who was a participant at the meetings, was asked to chair and organize the workshops on tuna movements. Hunter reports that his plan for these meetings has now been completed. Financial and logistic support for the meetings will be provided by the IATTC and the SWFC, and possibly other agencies involved in tuna research. The plan is to hold four workshops in the SWFC auditorium at La Jolla. During the four workshops, a panel of six members will discuss the issues with a series of invited expert consultants. The composition of the panel will remain the same throughout the meetings, but the consultants will change from meeting to meeting depending on the subject. The panel members will write the final report and assume responsibility for its content. The subjects which will be covered during the meetings are as follows: 1) recommendations for the consultation and analysis of existing tag recovery data; 2) models of tuna movements, oceanic features, sensing and measurement of the environment; 3) behavior and physiology of tunas in relation to movements; and 4) acoustic tracking and fishery-independent tag recovery systems.

Studies Resumed on Consumption of Adult and Juvenile Anchovy by Adult Chub Mackerel

Biological technician Eric Lynn and Lisa Lau have resumed work on stomach content analysis and gastric evacuation rates in chub mackerel (Scomber japonicus), interrupted by the necessity to prepare information required for the biomass estimate for the northern anchovy. The objective of Lynn and Lau's work on chub mackerel is to estimate, for one year, the consumption of anchovy stock by the chub mackerel population. This work will have significant implications for the management of the two species in the California Current. To accomplish this objective, about 100 fish stomachs will be examined for each of 12 consecutive months; the gastric evacuation rate will be estimated from laboratory experiments and the daily ration of anchovy and other foods consumed by mackerel calculated. The fish used for the stomach content analysis are provided by California Department of Fish and Game, and are taken by the fishery.

Analysis of data taken through February (628 stomachs) indicates that chub mackerel consume about 4.5% of their body weight per day. The proportion of anchovy in the diet has not yet been quantified but a cursory examination

of the data indicates that anchovy make up a large fraction of mackerel diet. Analysis of the remaining stomachs is expected to be completed by the end of this summer. Three gastric evacuation functions have been estimated from laboratory work and the average rate was used to calculate the above daily ration. Inspection of these data indicates that an initial gastric pause has a significant effect on estimates of gastric rates. Experiments planned this summer will determine if the gastric pause is an artifact of experiment design (a long interval between meals) or a consistent feature of mackerel digestion regardless of the meal frequency.

Progress Made in Development of Fish Aging Technique

Fishery biologist John Butler and biological assistant Susan Longinotti continue to investigate the physiological mechanisms underlying otolith increment formation in larval and juvenile fishes as an aspect of the development of aging techniques. This month, Longinotti reports that age determination of 1983 anchovy recruits is proceeding ahead of schedule with all otolith readings scheduled to be completed by the end of August.

Butler who is working on the aging of sardines has found that juvenile sardines have well-defined daily increments in their otoliths. He reports that age determination of juvenile sardines taken in 1983 should also be completed by the end of August. Butler plans to participate in the June cruise of the Scripps Research Vessel, New Horizon, where he will make special efforts to collect larval sardines for otolith analysis.

Peruvian Biologist to Learn Anchovy Aging Techniques at Center

Sponsored by a Fulbright Grant, Blanca Rojas de Mendiola from the Instituto del Mar del Peru, Lima, arrived at the Southwest Fisheries Center this month to begin work with fishery biologist John Butler for 5 months. Rojas de Mendiola, who is director of basic biology research on fishes at the Instituto, is here to learn more about the aging techniques developed at the Center for possible application to the Peruvian sardine.



* * * * *

NOAA Junior Fellow Marlene Johnson returned for a summer's work at the Center. Johnson will work with Butler to determine age and growth of juvenile anchovy collected during the recent biomass survey. She will also measure the

fat content of juvenile anchovy and sardines collected during the young fish survey conducted by the California Department of Fish and Game.

Commercial and Recreational Fisheries Research for Management

Research Plan Slowed for Groundfish in California

Full implementation of the Pacific Fishery Management Council's Fishery Management Plan for groundfish has been slowed by a number of biological, economic and managerial problems and uncertainties. A group of six fishery scientists from the La Jolla Laboratory (Drs. Dan Huppert, Alec MacCall, and Richard Methot) and from the Tiburon Laboratory (Drs. Norm Abramson, Mickey Eldridge and William Lenarz) of the SWFC was assembled to identify these problems and suggest short- and long-term research projects which would improve management of groundfish in California. The major problems identified were excess fleet capacity and the biological and fishery complexity of the multi-species groundfish assemblage, the uncertainties concerning status of stocks, stock productivity and socio-economic data.

Research to address the above management problems was categorized into six fields: basic biology, stock assessment, population dynamics, economics, management measures and allocation. The immediate need is for work in basic biology, stock assessment and economics. Results of these studies will enable work in population dynamics and evaluation of alternative management methods and allocations. In the field of basic biology, the group emphasized studies of reproduction and recruitment of the important stocks (e.g., sablefish and some rockfish). For species which are not as important, such as thornyhead, the biological work must start at the simple level of verifying a method of age determination. The group noted that stock assessment requires a long-term commitment to monitoring the species/size/age composition of the landings and by catch. Without this information, work on population dynamics and precise management will be impossible. Fishery-independent assessments of abundance also are necessary. The species most in need of such an assessment is sablefish; the group recommended a study of the feasibility of a tag-recapture estimate. Data on groundfish are seriously lacking in southern California where recreational fisheries land nearly as much groundfish as is landed commercially, and several important species are found primarily within 3 miles of shore. The group recommended a survey in FY85 to assess groundfish knowledge and management problems in southern California.

Current economic studies are focused on fleet descriptions. Results will enable a better definition of optimum yield and models which may predict and evaluate effort shifts caused by changes in fishery regulations and economic factors. This work is currently funded at an adequate level.

Studies of alternative management methods require a broad interdisciplinary approach. Scientific input to these studies must await

further progress in the other fields of research identified here. For the short-term, the PFMC mesh size experiment should be supported.

Work Continues on New Population Assessment Model

Dr. Richard Methot, Fishery Biologist, continues his work on a general population assessment model that incorporates fishery and survey data. The previous version of the model included only survey data and the iterative procedure used to estimate the parameter values that maximized the goodness-of-fit (maximum log-likelihood) and it did not use the second derivative of the log-likelihood with respect to most parameters. The current version of the model includes fishery and survey data and, for a 15-year time series and 6 age classes, it must estimate 41 parameters. The evaluation of the log-likelihood has been modified to improve speed and precision. The iterative search for the "best" parameter values has been improved by including a steepest-descent procedure. This procedure uses the first derivatives (rate at which log-likelihood changes as each parameter's value is modified) and the second derivatives (rate at which the first derivative changes as each parameter's value is modified). Trial runs on simulated data indicates that the procedure is slow but accurate. Methot will present his preliminary results at the Third Pacific Coast Resource Modeling Conference, June 14-16, 1984, in Davis, California.

Compilation of "Wetfish" Fleet Landings

Cynthia Thomson, Economist at the La Jolla Laboratory, has compiled information from California Department of Fish and Game landings receipts and other sources on the San Pedro purse seine fleet. An objective of this project was the documentation of changes in fleet size and fleet fishing capacity. Changes in capacity (due to permanent entry and exit from a fishery) and capacity utilization are important indicators of the profitability of a given fishing activity relative to other alternatives available to a vessel operator.

Piecing together information previously gathered by Dr. Dan Huppert and Jane McMillan, Thomson attempted to identify members of the "core" group of vessels which fish anchovy for reduction on a regular basis. Information gathered on these vessels includes: a. CFG and Coast Guard documentation numbers; b. year built; c. vessel length, gross tonnage and horsepower; d. crew size; e. area in which the boat customarily lands anchovy (San Pedro, Port Hueneme, Monterey); and f. where appropriate, the year in which the boat sank or was sold from the fishery.

Annual landings of anchovy, mackerel, bonito, bluefin, squid and herring were also tabulated for the years 1974-76, 1978-79 and 1981 for each of the San Pedro and Port Hueneme boats and 1978-79 and 1981 for the Monterey boats.

The 1974-76 data were obtained from the Coastwide Summary Data Base, 1978-79 data from CFG pink ticket data files for these years, and 1981 data from the 1981 PACFIN annual summary file.

Data indicate that the San Pedro-Port Hueneme fleet has declined in number from 42 vessels in 1974 to 32 in 1983 and that the Monterey fleet has increased from 5 to 8 during this same period. Extrapolating landings information on this fleet from previous years to 1982 and 1983 reveals significant changes in catch composition over the last decade, as shown in the accompanying table.

	Anchovy	Mackerel	Bonito	Bluefin	Squid	Total
1974-76 average:						
Landings (short tons)	111,099	16,974	4,137	2,312	2,038	136,470
Gross revenue (\$1000's, 1974=100)	3,864	1,622	1,081	1,255	132	7,954
1981-83 average:						
Landings (short tons)	31,848	50,316	4,392	1,390	1,394	89,340
Gross Revenue (\$1000's, 1974=100)	1,175	6,953	1,548	1,190	130	10,996

While average annual bluefin and squid landings have declined between 1974-76 and 1981-83, aggregate revenues from these species have remained fairly constant due to increases in ex-vessel prices. Price increases are also largely responsible for the increase in bonito revenues. Most notable are the decline in anchovy catch and the increase in landings of higher-priced mackerel. Annual fleet revenues have increased from an average of \$8 million (for 42 boats) in 1974-76 to \$11 million (for 33 boats) in 1981-83, with annual revenue per boat increasing from \$189,000 to \$333,000.

Theory Developed for Anchovy-Predator Relationship

Recreational fishermen have long contended that an abundant anchovy resource is needed to sustain large local populations of predatory fishes. While this argument is intuitively reasonable, there has been no evidence of an anchovy-sportfish relationship despite large changes that have been seen in anchovy abundance. Anchovies, moreover, may consume large quantities of sportfish eggs and larvae, and thus may be detrimental to sportfish abundance. Dr. Alec MacCall has developed a simple model which allows these positive and negative effects to be considered together, allowing theoretical evaluation of their relative importance.

Anchovies that are consumed by predators are assumed to be converted to predator eggs or offspring. This conversion may be a direct increase in fecundity, or may be indirect through predator growth. The fecundity relationship is assumed to be a linear function of anchovy abundance (A), with a positive fecundity occurring in the total absence of anchovies (fecundity = $a+bA$). The subsequent mortality of eggs and larvae is likewise assumed to increase linearly with anchovy abundance (mortality = $c+dA$), so predator recruitment (R) is given by (1) $R = S(a+bA)e^{-(c+dA)}$ which is similar to a Ricker stock-recruitment model, but does not necessarily pass through the origin of the axes R and A . Predator spawning abundance (S) is assumed to be proportional to predator recruitment.

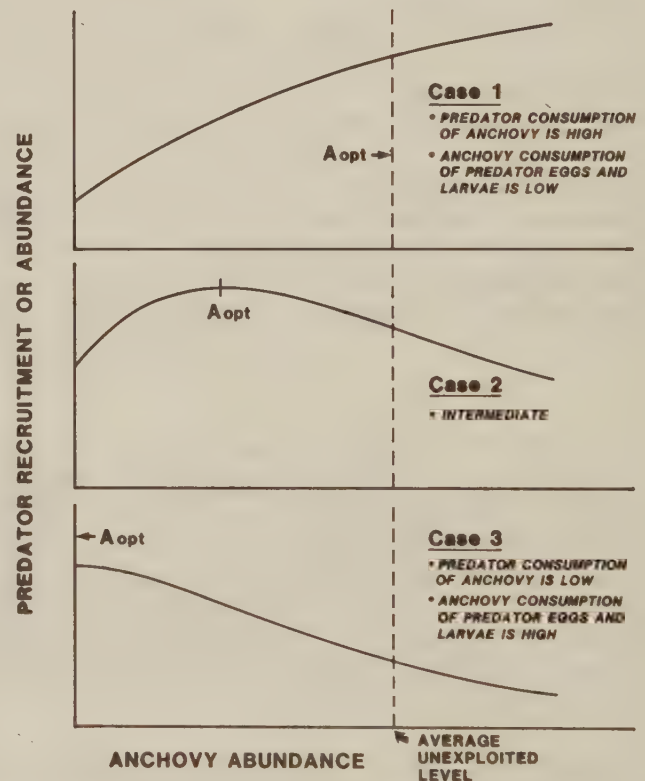
This model predicts that maximum sportfish recruitment occurs at a value of anchovy abundance (A_{opt}) which is (2) $A_{opt} = (1/d) - (a/b)$ if $(1/d) > (a/b)$; $A_{opt} = 0$ otherwise. Three cases can be identified (Figure 1).

CASE 1. Predators' offspring are not vulnerable to anchovies: A_{opt} is maximum possible anchovy abundance. This case corresponds to migratory predators that spawn elsewhere (e.g., albacore), or to locally reproducing predators whose offspring are not vulnerable to anchovies (e.g., sharks, marine mammals, seabirds).

CASE 2. Predators' offspring are vulnerable to anchovies, and adults are highly dependent on anchovies for forage: A_{opt} may be at intermediate anchovy abundance. This case potentially corresponds to many locally reproducing sportfishes (e.g., Pacific mackerel, bonito, barracuda), but see the discussion below.

CASE 3. Predators' offspring are vulnerable to anchovies, but adults consume relatively small amounts of anchovies for forage:

A_{opt} is zero anchovy abundance. This case pertains to deeper dwelling predators such as some rockfishes, and to fishes such as halibut, which consume forage smaller than anchovies.



It is probably not practical to measure the values of a , b and d , though it is theoretically possible to do so by analysis of stomach contents. Alternatively, approximate values from our knowledge of population dynamics and life history can be inferred. Anchovies undoubtedly consume a larger fraction of their own offspring than any other species, so $1/d$ for predators is likely to be several times larger than unexploited anchovy biomass. The

ratio a/b should be near the ratio of "other forage" to anchovies in the stomachs of predators, if measured near unexploited anchovy biomass. For example, California Department of Fish and Game biologists examined bonito stomach contents in 1968-69, and concluded that bonito ate about 75% anchovies by volume. Thus, a/b is about 0.33 times unexploited anchovy biomass for bonito, so expression (2) above still yields an A_{opt} , which is probably much larger than anchovy virgin biomass. Consequently, bonito fall into CASE 1, where A_{opt} is as large as possible. Using similar arguments, most other sportfishes are likely to fall into CASE 1, rather than CASE 2 or 3, suggesting that predation of sportfish offspring by anchovies is not detrimental enough to offset the beneficial effects of anchovies as sportfish forage.

Coastal Eastern Pacific Fisheries Environmental Investigations

Chromosomal Analysis Completed for Albacore, Yellowfin and Skipjack Tunas

Chromosomal analysis is being used as part of an investigation of the population stock structure of the North Pacific albacore, Thunnus alalunga. There is a growing body of evidence that North Pacific albacore are not as homogeneous as usually assumed. Results from recent tagging studies suggest that northern and southern substocks constitute the North Pacific albacore population and that these proposed substocks have different migratory patterns. Growth rates are also significantly different in the two proposed substocks. In addition, the differences in growth rate are consistent with differences in length frequencies of albacore caught in commercial fisheries off North America.

Dr. Michael Laurs, Dr. Frank Ratty, San Diego State University (SDSU) and Dr. Y.C. Song, SDSU and Wuhan University, Peoples' Republic of China, have completed a chromosomal analysis for albacore from the proposed North Pacific southern substock and compared the results with similar results they obtained for yellowfin tuna (Thunnus albacares) and skipjack (Katsuwonus pelamis).

The diploid chromosome numbers of the albacore, yellowfin, and skipjack tunas were found to be $2N=48$. The chromosome morphology of the albacore is more similar to that of the yellowfin than the skipjack. The albacore and yellowfin have three pairs of biarmed chromosomes and 21 pairs of uniarmed chromosomes while all of the skipjack chromosomes are uniarmed. C-banding showed variability in comparable chromosomes. The results support placing the albacore and yellowfin in one genus (Thunnus) and the skipjack in another (Katsuwonus).

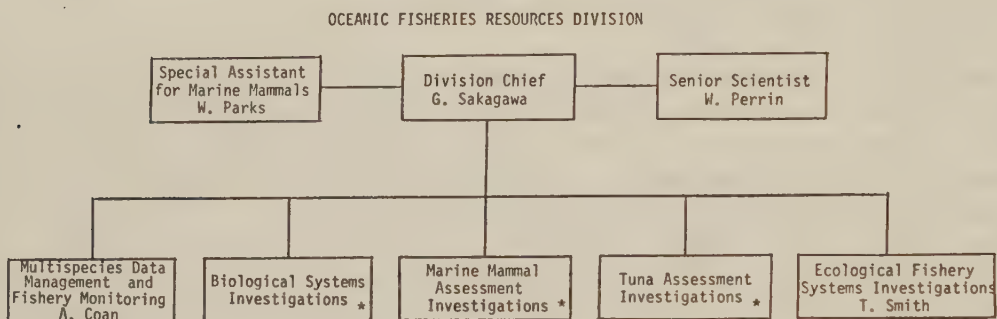
These results are from part of a larger study to determine if genetic heterogeneity exists in the North Pacific albacore population. Information on chromosome characteristics is scarce for fishes and this appears to be the first time chromosome analyses have been reported for scombrid fishes.

Oceanic Fisheries Resources Division

Reorganization of Oceanic Fisheries Resources Division Receives Washington Approval

On April 19, Deputy Associate Administrator for Science, Dr. Joseph Angelovic, formally approved the reorganization of the Oceanic Fisheries Resources Division in La Jolla. The reorganization involves the staff of the existing Tuna-Billfish, Marine Mammal Biology and Marine Mammal Monitoring and Assessment Programs and redistributes them into an organization which is more responsive to the current goals and objectives of the Oceanic Division.

Shown below is the structure of the Division as it has been reorganized.



The vacant positions of program leader for three of the new investigations (shown with an asterisk) will be advertised and filled by Merit Promotion Vacancy Announcements. According to Dr. Gary Sakagawa, Chief of the Oceanic Fisheries Resources Division, personnel at the Southwest Fisheries Center will be encouraged to compete for these positions.

Two positions, that of Leader, Ecological Fishery Systems Investigations, and special assistant for marine mammals have been filled by the lateral assignment of Dr. Tim Smith and Dr. Wesley Parks, respectively. Atilio Coan, who is presently Program Leader of the Multispecies Data Management and Fishery Monitoring Program, will remain in that position.

The reorganization also provides for the position of senior scientist, a position to which Dr. William Perrin was promoted this month.

35th Annual Tuna Conference Held

The 35th Annual Tuna Conference, chaired by fishery biologist Dr. Andrew Dizon, OFRD, was held at the University of California Conference Center at Lake Arrowhead, California, May 21 to 23. The main focus of the conference was the relationship of the tuna to its environment, an appropriate theme for the El Niño year of 1983. Papers reporting on research and other topics related to tuna were also presented.

The presentations were organized into four sessions: environment, analysis, biology, and future research. The SWFC was well represented in the 25 talks given: Dr. Michael Laurs, CFRD, convened the session on "The scombrid environment." Dr. Roy Mendelssohn, PEG, presented a talk entitled "Environmental influences on tuna catches in the Gulf of Guinea"; Dr. Steve Reilly, OFRD, and Hanna Bernard, OFRD, presented "Feeding habits of four species of scombrids off southern California during summer 1983--an El Niño year"; James Squire, OFRD, presented "1983 sea surface temperature changes in relation to catch-temperature parameters observed for some pelagic species off southern California"; and Paul Sund, PEG, brought participants at the Conference up to date on albacore research at PEG with a talk entitled "Descriptive albacore-environmental studies at PEG: a progress report."

Dr. Norman Bartoo, OFRD, convened the next session on "Tuna fisheries and their analysis." During that session, Dr. Sam Herrick, OFRD, demonstrated a cost and earnings budget simulator supporting his talk on "Cost and earnings of U.S. troll vessels participating in the North Pacific albacore fishery." Dr. Pierre Kleiber, OFRD, discussed "Cohort analysis without age information."

Dr. Elizabeth Vetter, NRC Fellow, OFRD, ran the session dealing with "The biology of the scombrid." In that session, Dr. Chris Boggs, NRC Fellow, CFRD, described results obtained during the course of his Ph.D. work at the Kewalo Basin Research Facility, Honolulu Laboratory, in a talk entitled "Energetics and tuna movements." Earl Weber, OFRD, after first pointing out that swordfish did not belong in the family Scombridae, gave a talk entitled "Reproductive potential of swordfish in southern California waters."

Dr. Gary Sakagawa, OFRD, closed the conference with a session on "Future research." In that session Laurs presented "The NMFS strategic plan for albacore research and management," authored by David Mackett of the Center Director's office.

The Conference closed with a business meeting at which Kurt Schaefer of the IATTC was appointed as next year's Chair.

Abstracts of all the talks will be published and distributed to participants; copies will also be made available to other interested individuals on request to the Director, SWFC.

Tuna Assessment Investigations

Pacific International Billfish Angler Survey

James Squire, Fishery Biologist, reports that, based on the results of the 1982 billfish angler survey, the amount of information available on the catch-per-unit-effort (catch-per-angler-day) for the recreational billfish fisheries is small when compared with the information available for the commercial fisheries. To obtain vital data, the Pacific billfish angler survey has been conducted annually since 1969 by NMFS in cooperation with the International Game Fish Association to determine the trend in billfish catch per angler day

for various locations throughout the Pacific. The information derived from this survey is then summarized by geographical area and species caught, and made available to anyone interested in the trend of billfish fishing. These data have been used by governments and organizations in the development of management plans for their billfish fisheries.

Interest in the trend of billfish catch rates in the Pacific has grown as a result of data collected by the billfish angler survey. The declining trends during the 1970's in catch rate for species such as striped marlin and black marlin have concerned many anglers. In some areas of the Pacific, regulations have been implemented in an attempt to reverse these trends, and the angler survey may provide data relative to the future effectiveness of such regulations.

From results of the 1982 billfish angler survey, 9,949 angler days in the Pacific and Indo-Pacific Ocean were reported; the total number of billfish (blue and black marlin, striped marlin, and Pacific sailfish) reported was 5,058. The total of angler days was a decrease of 1,201 from the 1981 total, which was 11,150. The total number of billfish caught in 1982 was an increase of 898 over the 1981 total, which was 4,160. The Pacific-wide billfish catch rate for 1982 was 0.51 billfish per angler day, or 1.96 days per billfish, an improvement over the 1981 rate (0.37 fish/day or 2.68 days/fish).

In 1982 catch rate for striped marlin (Figure 1) caught off Baja California was 0.62 fish per day, which was an increase from the 1981 rate of 0.51 fish per day. The 1982 catch rate for striped marlin off southern California was 0.10 fish/day, a decline from the 1981 rate of 0.17 fish per day. The sailfish catch rate (Figure 2) for Acapulco was 0.9 fish per day, although important sailfish fishing areas such as Panama recorded 1.1 fish per day and Costa Rica recorded 1.14 fish per day. The 1982 catch rate for black marlin off Australia (Figure 3) was 0.5 fish per day, similar to the rates observed since 1978. The blue marlin rate for the Hawaiian Island area (Figure 4) was 0.19 fish per day in 1982, a slight increase from the 1981 rate.

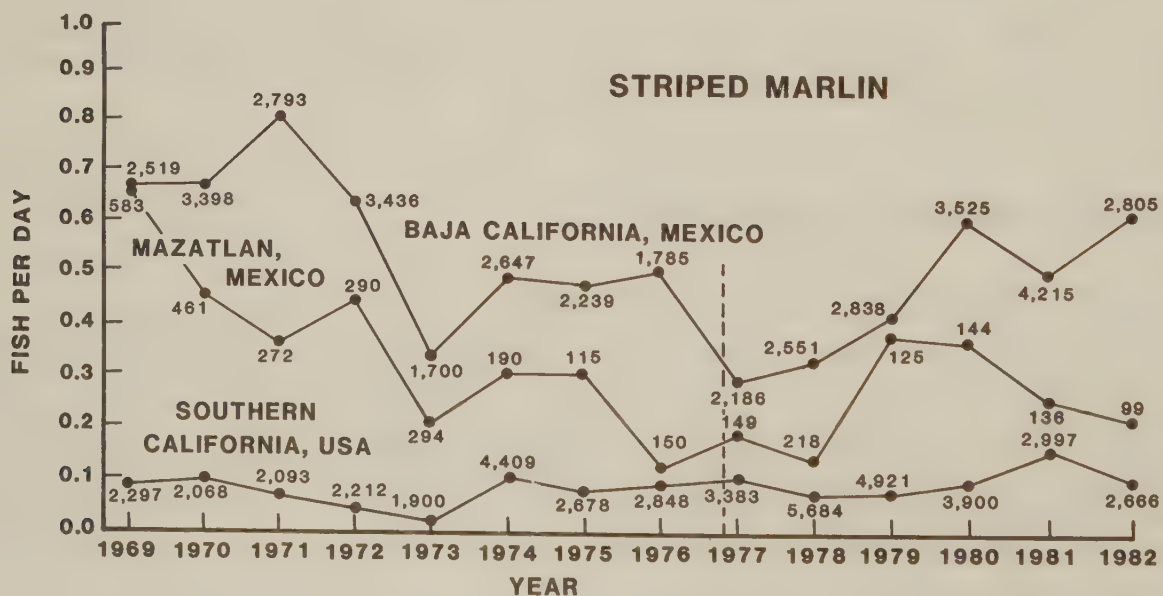


Figure 1. Catch per angler day for striped marlin. Number of angler days reported is given for each year.

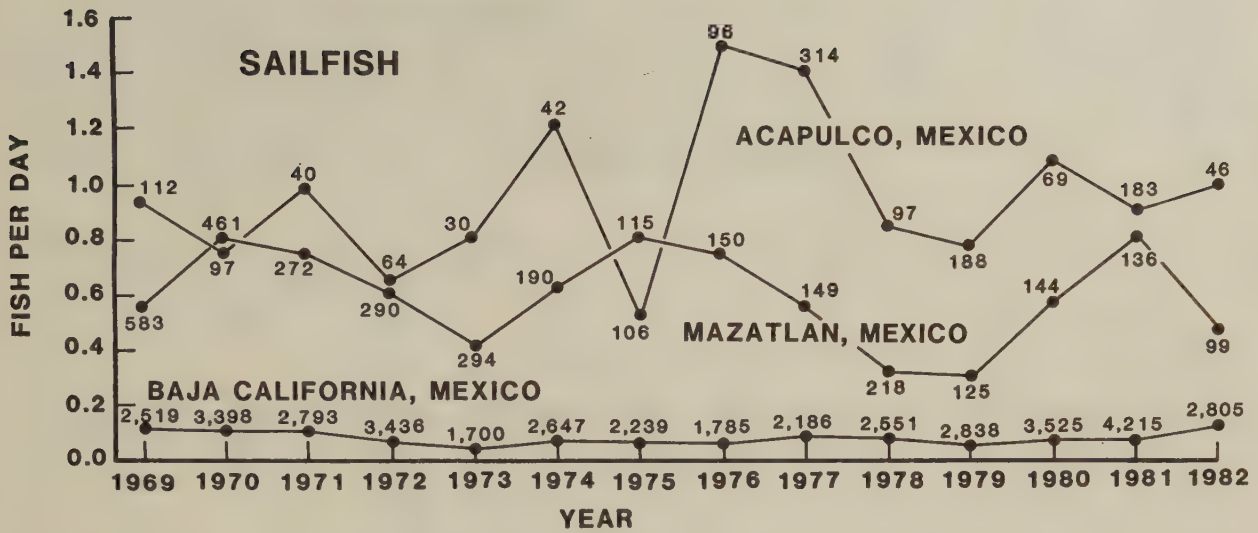


Figure 2. Catch per angler day for sailfish. Number of angler days reported is given for each year.

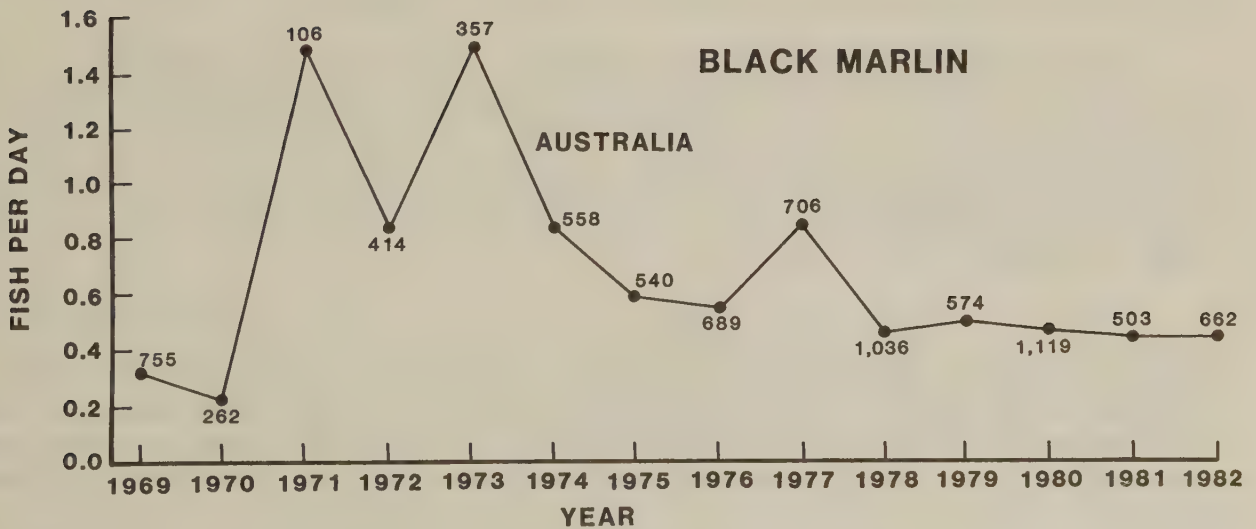


Figure 3. Catch per angler for black marlin off northeast Australia. Number of angler days reported is given for each year.

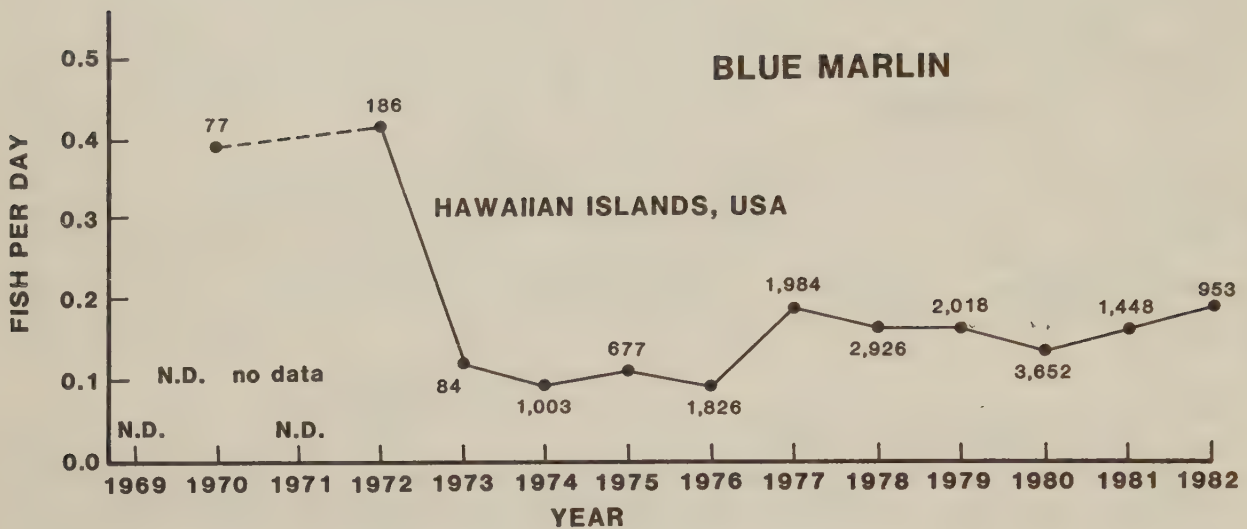


Figure 4. Catch per angler day for blue marlin about the Hawaiian Islands. Number of angler days reported is given for each year.

Marine Mammal Assessment Investigations

Observer Effect Analysis Completed

Bruce Wahlen, Statistician, reports that he and Dr. Tim Smith, Fishery Biologist, submitted their paper, "Observer effect on incidental dolphin mortality in the eastern tropical Pacific tuna fishery," to the U.S. Fishery Bulletin this month. The analysis was begun in late 1980 after Wahlen and Smith reviewed a Master's degree internship report, written by a former purse seine crew member, documenting dolphin kills the author had recorded during a purse seine fishing trip made without a scientific observer.

Wahlen and Smith's paper establishes the existence of an observer effect on incidental dolphin kills, which they defined as a differential in levels of dolphin kill between purse seine fishing trips made with and without a scientific observer. Establishment of the existence of such an effect is significant because it implies that estimates of total dolphin kill derived from data collected by these non-crew member observers are in fact underestimates.

Wahlen and Smith established the existence of an observer effect by comparing dolphin kill data collected by scientific observers who differed in their purposes of data collection. Some observers collected data for research purposes only, while other observers collected data for both research and enforcement of dolphin-release regulations. The latter observers with both purposes of data collection were considered to be more obtrusive to vessel operators than the observers whose sole purpose was research. This method is analogous to the indirect method of testing for the existence of a tagging effect on fish in which the researcher compares proportions of tags returned from fish tagged under different conditions.

Comparisons were made between data collected by observers with both research and enforcement purposes of data collection and observers with research purposes only. Data collected by observers with both purposes of data collection evidenced a significantly larger percentage of dolphin sets in which no dolphins were killed than data collected by observers with research purposes only (Figure 1).

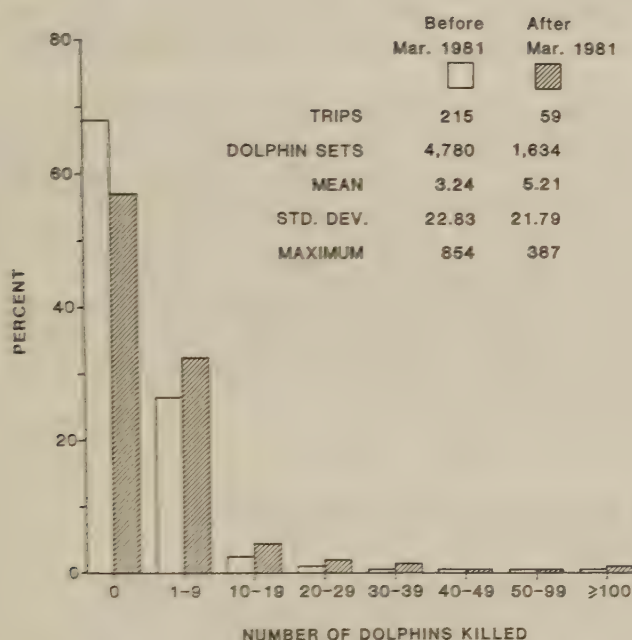


Figure 1. Relative frequency distributions of number of dolphins killed incidentally during sets of NMFS scientist-observed trips from 1978 through 1982, by trip departure date. (Before March 1981, NMFS observers were allowed to collect data for both research and enforcement purposes. After March 1981, NMFS observers were under court order to collect data for research purposes only.)

This one-sided difference between data collected by more and less obtrusive observers implies the existence of an observer effect on incidental dolphin kills. However, since only limited data are available from fishing trips made without a scientific observer, the absolute magnitude of this effect cannot be estimated.

The final draft of this paper incorporated suggestions received from members of pre-SOPS Panel D who met at the SWFC in December 1983 to review papers dealing with the estimation of dolphin mortality incidental to purse seining.

Study on Food Habits of the Northern Elephant Seal Conducted

Dr. Doug DeMaster, Fishery Biologist, reports that field work was undertaken on a cooperative research project involving scientists at the SWFC and scientists at the National Marine Mammal Laboratory (NMML) in Seattle, Washington, to study the food habits of the northern elephant seal, Mirounga angustirostris, at San Miguel Island, California. Participating scientists from SWFC included DeMaster, Sandy Hawes, Larry Hansen, and Mark Lowry; scientists from NMML were George Antonellis and Tom Loughlin.

The objective of the joint project is to determine how a population of elephant seals affects fisheries resources off the California coast. The study focused on determining what a healthy elephant seal eats. Adult females and juvenile males which had recently returned to the Island to molt were captured and immobilized with a tranquilizer. The animals were then lavaged using an apparatus developed by the NMML scientists. Squid beaks, fish otoliths, and other prey remains were recovered from all but 3 of the 60 animals captured. The samples are currently being identified by the NMML scientists. A report of the results of this work will be submitted for publication at a later date.

Ecological Fishery Systems Investigations

Financial Analysis of U.S. Troll Vessels Participating in the North Pacific Albacore Fishery Underway

Dr. Sam Herrick, Industry Economist, reports that a trip cash flow model has been constructed for U.S. troll vessels participating in the North Pacific albacore fishery. In the model, revenue and cost elements for an albacore fishing trip were analyzed using an electronic spread sheet.

Cost equations relating catch and cost elements to a vessel's physical characteristics were derived using cost and earnings data, and catch and effort data were provided by 57 vessels that participated in the North Pacific albacore fishery during the years 1976-1982. Hold capacity was found to be the most significant physical characteristic in explaining a vessel's daily catch rate while fishing and daily fuel consumption while at sea. The catch rate and fuel consumption relations were then used to predict the vessel's respective gross revenue and fuel cost for an albacore fishing trip of specified length. Galley, gear and labor costs were also estimated for the trip. The model predicts the net cash flow for a trip of given length for a particular vessel, which is described by its physical characteristics.

Results from the model were then used to derive cost functions that relate the cost per ton of albacore caught to the level of catch. The cost functions were in turn used to conduct a break-even analysis, which determines the level of albacore catch necessary for a vessel to just cover its fishing trip costs.

Results of exercising the model suggest that, in 1982, the break-even catch for vessels greater than 40 tons hold capacity was approximately 45 tons; for vessels of 40 tons capacity or less the break-even tonnage was approximately 5 tons. Catches greater than these amounts would result in a positive contribution to the vessel's fixed costs of fishing.

Biological Systems Investigations

SWFC Scientist Participates in Joint US-USSR Research in Moscow

Dr. Al Myrick, Leader, Marine Mammal Age Determination Project, recently returned after completing a month of joint research with Dr. G.A. Klevezal, Koltzov Institute of Developmental Biology, in Moscow at the invitation of the USSR Academy of Sciences. The discovery of parturition layers in teeth of female spotted and spinner dolphins made earlier by Klevezal and Myrick, and recently reported in the Journal of Mammalogy, formed the basis for extending the search for reproductive layers to the teeth of other marine mammals. The investigations, conducted jointly by Myrick and Klevezal in Moscow, were focused primarily on the teeth of female sperm whales, but other chemical and spectrophotometrical analyses were initiated on spinner, spotted, and bottlenose dolphin teeth to get a more quantitative description of the reproductive layers.

From the study of 128 female sperm whale teeth the two scientists found a very high coincidence of strongly contrasting layers with what appears to be the postpartum stage of reproduction. The results suggest that some of the dental layers may be used to determine length of calving intervals and possibly even the rate of unsuccessful pregnancies in sperm whale populations. By the end of the visit, Myrick and Klevezal had completed the analysis on sperm whales and were well into the process of drafting a manuscript of the study.

During the visit Myrick also addressed members of the Academy and prominent Soviet marine mammal scientists, speaking on the subject, "Recent advances in marine mammal sclerochronology." The basic theme of his talk was that layers in hard tissues, used in the past mainly as age determination tools, may also be used to make interpretations of the physiological histories of individuals, once the meaning and etiology of the specific layering patterns are deciphered.

Database Established for Spinner Dolphin Age Estimates

Priscilla Sloan, Fishery Biologist, reports that age estimations are continuing from the sample of thin sections of teeth from 2300 female spinner dolphins, Stenella longirostris, from the eastern tropical Pacific tuna purse-seine fishery. A database for age estimates for the spinner dolphins has been established and the first 400 entries have been made by key-entry operator Rita Ford. Edit programs, designed to pinpoint tooth-reader and data-entry errors, have been updated by computer programmer Joe Joy.

PACIFIC ENVIRONMENTAL GROUP

Ocean Climatology and Monitoring

For several years, Dr. Douglas McLain has been assisting the staff at the Fleet Numerical Oceanography Center (FNOC) with suggestions for improvement of their Cooperative Oceanic Observations Program (COOP). In this program FNOC cooperates with almost 200 merchant and naval vessels which make subsurface temperature observations globally using expendable bathythermographs (XBTs). The observations generated by the COOP program are vital for PEG's research on marine climate changes that affect fish populations. For example, during the El Nino of 1982-83, subsurface temperature increases associated with deepening of the thermocline were much more dramatic than the more widely reported increase of the surface temperature. Increases in the thermocline depth along the California coast caused anomalous coastal currents in which southern species moved northward and reduced nutrient supply to the surface waters and caused drastic declines in the biological productivity of the coastal waters. Low trophic-level predators such as anchovy and squid were not abundant (or at least not easily available to fishermen) and high trophic level predators such as salmon, marine mammals, and birds suffered poor growth and reproduction, apparently due to a decrease in food availability. Because of the importance of these effects, it is necessary to monitor subsurface temperature fluctuations along the coast. Although such monitoring is prohibitively expensive using research vessels, observations from ships-of-opportunity are inexpensive and COOP data document the subsurface temperature changes well. In addition to the value of the COOP data in PEG's research, support of the COOP program is beneficial in providing a visible benefit to the Navy for PEG's location at FNOC.

In the past PEG has supported development of sophisticated software to process and display XBT data on FNOC mainframe computers, using NSF and ERL-EPOCS funds. The software is now well developed and is used routinely by the COOP program. A current problem is replacement of analog strip chart XBT recorders with micro-computer based digital systems. The strip chart recorders are no longer being manufactured. The digital systems, however, are very popular because they are much easier to use and thus allow an increase in the number of observations and digital systems have greater accuracy and flexibility and allow greater timeliness of data reporting; thus, they are not always available. FNOC now has seven digital systems installed on merchant ships and is installing more at the rate of about five per year. Last year PEG was involved in development of improved software for these systems to allow reporting of weather as well as subsurface temperature data. Funds for this work were provided by NOAA Climate Program Office.

Recently two mainframe computer programs have been updated by Dr. McLain, and by Compass Systems Inc., under contract to PEG. These programs process and display data from the digital systems. During a test of the digital system on a round-the-world cruise of the Dutch container ship Nedlloyd Kimberly in spring 1983, the system worked well and the revised programs were

used to process the data. One of the programs provides an initial "quick look" at raw data from the systems (Figure 1) and shows obvious errors (due to wire breaks or electrical insulation problems). The figure shows a relatively deep thermocline off California which was caused by the El Nino conditions at the time. PEG is now supporting programming to interface the digital systems to GOES satellite radio transmitters for almost instantaneous transmission of the data to analysis centers (FNOC, National Meteorological Center, and others).

Although most digital XBT systems are installed on merchant or naval vessels, the systems are sufficiently compact and portable to allow use on fishing vessels. Possible uses include (1) obtaining detailed environmental data on tactical fishing situations or (2) making observations in data sparse areas such as the eastern tropical Pacific where data are needed for research on El Nino and distribution of tropical tuna or in the mid-Pacific to support the expansion of the albacore fishery. Interface of the systems to miniaturized salinity-temperature depth probes is possible to resolve salinity as well as temperature fluctuations and to reduce the need for expensive research vessel time for routine oceanographic observations.

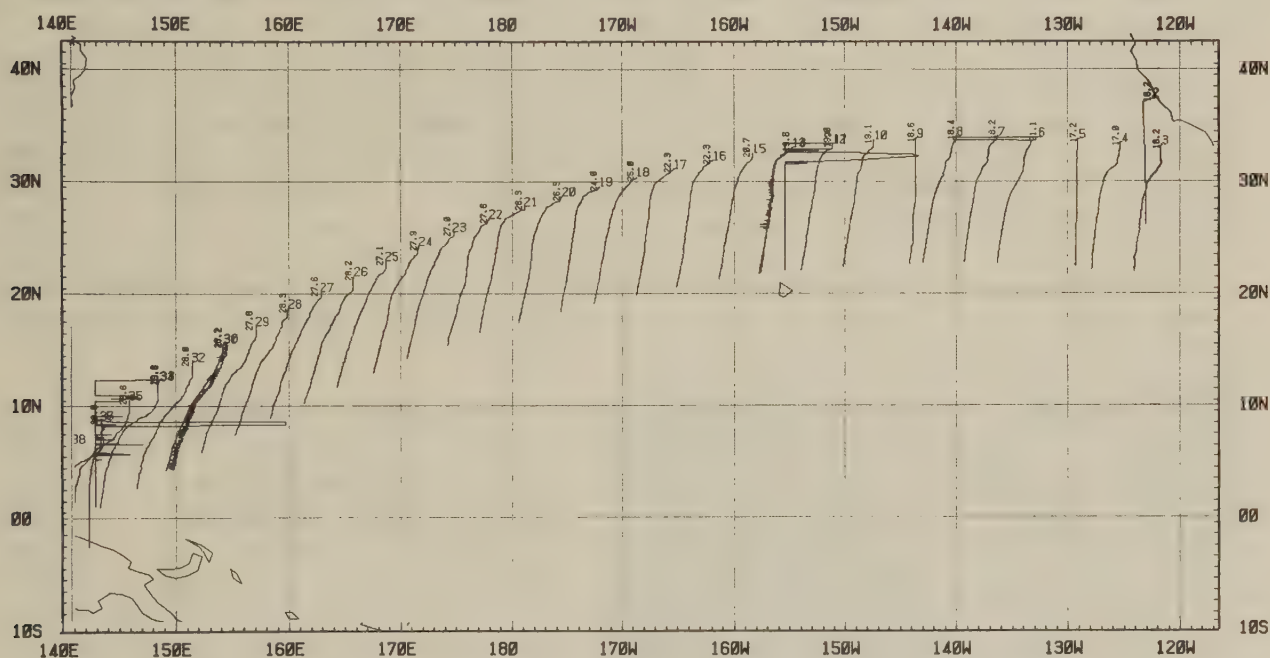


Figure 1. "Quick-look" plot of digital expendable bathythermograph data collected between California and New Guinea on a round-the-world cruise of the Dutch container ship Nedlloyd Kimberly in May-June 1983. Data are shown exactly as recorded on digital cassette tape. Numbers next to each trace are the observation number and the sea surface temperature. Obvious errors in the data are due to wire breaks and electrical grounding problems and will be removed before data are archived at Fleet Numerical Oceanography Center and National Oceanographic Data Center.

TIBURON LABORATORY

Fish Communities Investigation

1977 Year-Class Continues to Dominate Landings of Bocaccio in Northern California

Dr. William Lenarz, Leader of the Groundfish Analysis Task, recently reviewed data collected from northern California landings of bocaccio, Sebastes paucispinis. The data were collected by a cooperative sampling program of the California Department of Fish and Game and NMFS.

In 1978 significant numbers of the 1977 year class began appearing in the landings as one-year-old fish. Since bocaccio are not fully recruited until about age four, the landings suggested that earlier indications of a strong 1977 year class were valid. In 1977, researchers, including Dr. Edmund Hobson of the Tiburon Laboratory, noted that juvenile bocaccio were unusually abundant in nearshore waters.

The 1977 year class appears to be strong. In 1979 it was a very important component of sampled landings and it dominated samples between 1980 and 1983. In 1981 more than 50% of sampled fish were from the 1977 year class. The percentage dropped to 29% in 1983, but the 1977 year class was still the most important.

Northern California landings of bocaccio increased as the strong year class entered the fishery, but not enough to indicate that it caused a major increase in the biomass of bocaccio (Table 1).

Table 1. Estimated landings of bocaccio in northern California.

Year	1978	1979	1980	1981	1982
Landing (1000 MT)	1.8	2.5	2.7	3.5	3.2

However, landings of bocaccio during the period were affected by factors other than year-class strength. Fleet size increased considerably and there was a major expansion in fishing for widow rockfish, S. entomelas. The fishery for widow rockfish probably attracted some fishing effort that would normally have been directed towards bocaccio and also caused disruptions in the market. As more data accumulate, it will become possible to conduct cohort analyses, which can then be used to provide better estimates of the strength of the 1977 year class (as well as others) and develop a better understanding of the dynamics of the bocaccio fishery.

Computer Program Developed to Aid Determination of Juvenile Abundance

Fishery biologist Tina Echeverria, working with NOAA Corps Officer Fredric Plotkin, has designed and written a data entry program to be used aboard the NOAA Ship David Starr Jordan. The command program, written in DBASE II, is designed for the daily input of position, meteorological, and catch data for each haul. During Cruise 84-06 biologists will attempt to determine the abundance and distribution of juvenile rockfish in the waters between Cape Mendocino and Point Sur. The program will provide a current summary for biologists of where, when, and how juvenile rockfish were caught with a particular type of gear, as well as a cruise summary upon completion of the cruise.

Underutilized Fishery Resources

Experimental Fishing Cruise Aboard Jordan Produce Mixed Results

Experimental fishing during a cruise on the NOAA Ship, David Starr Jordan, from May 3-11 produced mixed results. Accompanying cruise leader Sus Kato were Tiburon laboratory biologists Bill Leet and Sennen Salapare, San Rafael resident Sam Wilson, and University of California at Santa Barbara students Paul Rawson and Simon Bluestone. According to Kato, high winds prevented experimental fishing trials for octopus and halibut in areas of known abundance of those species near the northern Channel Islands. Bottom longline and experimental off-bottom longline were ineffective, partly due to the weather and partly because of extensive gear loss, which was possibly caused by blue sharks.

One bright note was the substantial catch of spot prawns in traps set near Santa Cruz Island. Nineteen pounds of prawns (average about 7 prawns per pound) were caught in 17 traps (Figure 1). Twelve traps were lost when the groundline parted. Traps adjacent to the lost series of traps produced all the prawns, and it is likely that the catch rate would have been much higher had all the traps been recovered. Details of the catch locality have been given to some Santa Barbara fishermen and the local Sea Grant Marine Advisor.



During the cruise, the fish aggregating device--a float supporting strings of kelp moored to an anchored buoy--was partially repaired. Since its deployment at 60-Mile Bank in June 1983 it apparently has been vandalized; the beacon light had been removed, a hole shot in the waterproof battery pack, and the mooring line for the attractor float cut.

At Tanner Bank 30 ocean whitefish were taken by hook and line. One of the fish was prepared as "sashimi" (raw fish, thinly sliced and served with horseradish and soy sauce) and taste-tested by several crew members and the scientific staff. Two persons detected a slightly bitter taste, while all others thought the fish tasted fine. Ocean whitefish has a reputation for sometimes having bitter flesh, especially when taken in shallow waters. The bitter taste may be one reason for the lack of a commercial fishery for the species. Flesh of the bitter fish was preserved for analysis to determine the cause. The fish had pelagic red crabs in its gut, as did most of the whitefish caught at Tanner Bank. After the cruise the ocean whitefish was distributed to fish dealers and restaurants in Los Angeles and Santa Barbara. Early reports indicate that the fish is considered an excellent sashimi fish and most sushi shops would gladly have it on their menus. One fish dealer claims, however, that the cost of the fish must be kept low at first in order to introduce it in the local sushi shops. No complaints have been received regarding the taste.

FISHERIES INFORMATION SYSTEMS & AUTOMATIC DATA PROCESSING

PACFIN Update

Fred Kellenberger and David Mackett, SWFC, and Svein Fougner, SWR, developed a Pacific coast salmon questionnaire with two goals: to solicit the opinion of a broad group of fishery administrators, economists, managers, policy makers, researchers, enforcement officers, and fishing industry personnel on the use of and need for salmon catch and effort data during and between seasons, and to increase awareness by the research group of the data collection and dissemination activities of the PACFIN project.

The questionnaire was designed to contact approximately 70 decision makers in fishery management, research, and development about their opinions on salmon data needs, uses, and timeliness; obtain a response rate of about 50% of the questionnaire; complete the questionnaire process in about 3 months; and ensure the distribution of a summary report on questionnaire findings to the PACFIN Data Committee and officials and all questionnaire respondents.

More than 80 salmon questionnaires were sent out to fishery managers, council members and advisors, biologists, economists and staff analysts, and enforcement officials in early 1984. Sixty percent of the completed questionnaires were returned.

Based on the overall tabulation and the categorized summaries, Fougner, Mackett and Kellenberger reached the following conclusions: 1) The responses demonstrate that managers and administrators agree on the need for timely and relatively standardized data on the California, Oregon, and Washington ocean and inside water salmon fisheries. 2) A coastwide system and organization to compile and distribute weekly summaries of catch, landings, and effort data within 7-10 days of landings should be evaluated. 3) Few respondents were concerned about possible confusion from data sets if "preliminary" data and updated data are available at the same time. If designated individuals in state agencies are the primary sources of data, and if each successive report is clearly described in terms of cut-off date and completeness, there would not be many problems. Inasmuch as management decisions (e.g., closures) are made and subsequent results (e.g., loss of charter customers whose reservations have to be cancelled) are derived from the preliminary data, it seems reasonable that broad rapid distribution of each updated set should be the goal. 4) Many said they are generally satisfied with the data they now get (principally from state agencies), but many of these respondents had useful suggestions for and/or felt there could be improvements in the data. Timeliness seemed to be universally acknowledged as a critical factor. 5) Respondents generally found the "cost estimate" for an improved system to be acceptable. 6) Virtually all respondents not familiar with PACFIN want more information about PACFIN and the data or reports available through the system.

A Pacific Coast Fishery Information Network (PACFIN) meeting with the states, NMFS and Council will be held in July to discuss the results of the questionnaire.

Shipboard Requirements Committee Report

The sub-committee members of the Shipboard Requirements Committee, Al Coan, Rich Charter, Susan Iacometti, and Dorothy Roll met during May to design the Master Plan for the Shipboard Molecular System. The plan included the diagrams which depicted the hardware and software design of the recommended system, the priority list for the hardware requirements, and the priority levels for the software development. The proposed plan was presented to the Shipboard Requirements Committee on Wednesday, May 30. The committee members, Rich Charter, Ron Lynn (CFRD), Al Coan, Wes Parks (OFRD), Susan Iacometti, and Dorothy Roll, Chairperson (ADP) accepted the plan with suggested modifications. The recommended plan will be submitted to the Center Director and Fred Kellenberger, Data Systems Manager, for their comments on what hardware can be purchased with this year's funds.

Wordprocessing System

The Wordprocessing Committee composed of Frances Tonsich, Nancy LaRoche (Director's Office), John Hunter, Julie Shoemaker (CFRD), Andy Dizon, Frances Begley (OFRD), Lorraine Prescott (TSG), Susan Iacometti, and Dorothy Roll, Chairperson (ADP) held two meetings during May to discuss the wordprocessing needs of the secretarial staff. During the past 2 months, the secretaries have received WordStar disks from the scientific staff for processing. Their experiences show that unless certain procedures are followed by the authors, the time expended in producing a final letter quality printed copy of the edited document is equivalent to or greater than the time it would take to rekey the document. To implement WordStar effectively, which is the wordprocessing system selected for the La Jolla Laboratory, the committee drafted a set of procedures which must be followed by the scientists when creating a file for processing by the secretary.

Lorraine Prescott, Frances Begley, Barbara Engstrand, and Julie Shoemaker were delegated as sub-committee members to formulate 1) the list of commands and frequently used text string to be programmed on the function keys of the AVT CRT terminals, and 2) the selection of characters for a customized thimble for the NEC letter quality printer. The chairperson for the sub-committee is Julie Shoemaker.

Other ADP Activities

Susan Iacometti, Computer Systems Programmer, continues to make minor changes, requested by Dr. Dan Huppert, on the PACFIN monthly summaries. For Dave Holts, she re-transmitted the shark data from the Coastwide/PACFIN data bases to the LJ Standard Micro-computer floppy disks and made a backup data tape on the VAX system.

Susan Iacometti conducted five, 3-hour sessions of the Introductory WordStar classes for center secretaries who have not had the training. The secretaries attending are Helen Becker (OFRD), Mary DeWitt (TSG), and Espie Manaligod (Admin.). The scientific staff, who filled the available training slots are Jim Squire (OFRD), Barbara MacCall, Elaine Sandknop, and Betsy Stevens (CFRD).

ADMINISTRATIVE ACTIVITIES

A-76 Update

The Southwest Fisheries Center provided comments to the Arthur Young Draft Management Efficiency Study (MES) on May 2, 1984. At the same time, Arthur Young furnished a "final" MES which was rejected by the Center because the Company could not have taken the Center's comments into consideration. Arthur Young has appealed to the NOAA Contracting Officer who is reviewing the situation. As of the end of May, the A-76 Study is approximately 9 weeks behind schedule.

MISCELLANEOUS

Public Affairs

Honolulu Laboratory

- May 19 - Laboratory Director Richard S. Shomura spoke at the UH Marine Option Program graduation ceremony at the Waikiki Aquarium.

Press Release

Honolulu Laboratory

- May 21 - "Fishery Survey in Marianas Completed."

Seminars

Honolulu Laboratory

- May 31 - Witold Klawe, Inter-American Tropical Tuna Commission, spoke on "Exploitation of fishery resources (inclusive of ghost fishing): A system model."

La Jolla Laboratory

- May 15 - CDR. Skip Theberge, NOAA Corps, Scripps Institution of Oceanography, presented a seminar on "Advanced survey and seafloor imaging techniques."
- 24 - Dr. Elizabeth Venrick, Scripps Institution of Oceanography, presented a seminar "Chasing a woozle: A woman in oceanography."

Tiburon Laboratory

- May 23 - Dr. Mary Silver, Center for Coastal Marine Studies, University of California Santa Cruz, presented "Feeding the deep sea: The oceanic rain of detritus." The Tiburon seminar series is a cooperative effort of the Paul F. Romberg Tiburon Center for the Environmental Studies, San Francisco State University, and the Tiburon Laboratory.

Visitors

Honolulu Laboratory

- May 4 - William G. Gordon, Thomas J. Billy, NMFS, Washington, DC, and Dr. Melvin W. Eklund, NMFS, Seattle, Washington, visited Richard Shomura.
- 7 - Henry Sakuda of the Hawaii Division of Aquatic Resources, and Ron Walker of the Hawaii Division of Forestry and Wildlife visited Richard Shomura, William G. Gilmartin, and John R. Henderson to discuss "off limits" areas at Green Island, Kure Atoll.
- Dr. John Craven and Gary McMurtry, UH, met with Richard Shomura to discuss Makalii activities in the Northwestern Hawaiian Islands.
- Richard Uchida and Bernard M. Ito met with Kitty Simonds and Paul Bartram of the Council, and Wilfred Maeda of Maeda Fish Market to discuss potential problems with collecting data and ovaries from uku, Aprion virescens, and onaga, Etelis coruscans, landed by commercial fishermen for Oahu's fresh fish market.
- 29 - Nancy Pola-Swan, NMFS Seattle, Washington, visited Richard Shomura.
- 31 - Capt. Robert L. Sandquist of the Pacific Marine Center, National Ocean Service, Seattle, Washington, visited Richard Shomura.

La Jolla Laboratory

- May 1 - Dr. Randall Petermann, Simon Fraser University, Vancouver, British Columbia, Canada, visited the Center.
- 3 - Dr. Phillip Sluczanowski of Adelaide, Australia, visited Coastal Division staff.
- 15 - Mr. Farouk M. Baraka, Deputy Director, Personnel Department, Ministry of Foreign Affairs, Egypt, and Mr. Parrwiz Hossen, First Secretary, Political Section, Ministry of External Affairs, Mauritius, met with Dr. Barrett.
- 30 - Mr. Dick Roe, Director, Office of Protected Species and Habitat Conservation, Washington, DC, and Mr. Gary Smith, Deputy Director, Southwest Regional Office, were at the Center for a tuna/porpoise meeting.

Pacific Environmental Group

- May 8-9 - Mike Laurs, Southwest Fisheries Center, La Jolla, California, and Ted Saur, Scripps Institution of Oceanography, La Jolla, California, visited the Center.

Tiburon Laboratory

- May 17 - Raul Rodriguez of the Fishermen's News, Los Angeles, California, interviewed Sus Kato.
- Bruce Wyatt of Sea Grant, University of California at Davis, met with Sus Kato to discuss herring marketing and the hake project.
- 29 - Dr. Marc L. Miller of the University of Washington, Seattle, Washington, met with Ed Ueber to discuss sociological and anthropological research in Bay Area fisheries.

Meetings and Travel

Honolulu Laboratory

- May 1 - Richard Uchida and Dr. George W. Boehlert met at the Oceanic Institute with Dr. Edward Myers, Office of Oceans Minerals and Energy, NOAA; Dr. Edward Noda, Elaine Tamaye, and Brian Ishii of Ed Noda and Associates; Charles Leavitt and Herbert Coughran of TRW; Dr. Allen Atkinson, private consultant with Systems Engineering; Dr. David Zieman of the Oceanic Institute; Dr. Richard Brock of the UH Sea Grant Program; and John Naughton, Western Pacific Program Office, SWR, to discuss current status of models assessing environmental impacts of Ocean Thermal Energy Conversion operations.
- 1-3 - Richard Shomura attended the National Fisheries Institute convention at the Sheraton Waikiki Hotel.
- 2-31 - Dr. George Boehlert traveled to Tokyo and Hakodate, Japan, to conduct cooperative research on Sebastes with Japanese scientists at the Faculty of Fisheries, Hokkaido University, the Hokkaido Institute of Mariculture (HIM) in Shikabe. Dr. Boehlert presented a seminar, "Coastal and seamount fisheries research in the Hawaiian Archipelago," at Hokkaido University on May 16 and at HIM on May 28.

- 13-17 - Richard Shomura traveled to American Samoa for meetings with officials and representatives of the Government of American Samoa, tuna industry, and NMFS.
- 18 - Richard Uchida represented Richard Shomura at a meeting of the Hawaii Fisheries Coordinating Council at the Department of Land and Natural Resources board room.
- 21 - Richard Shomura attended a "Small computers in government" seminar at the Hawaiian Regent Hotel.
- 21-23 - Dr. Richard Brill attended the tuna conference at Lake Arrowhead, California.

La Jolla Laboratory

- May 1-3 - Dave Mackett traveled to Washington, DC, to attend budget hearings and assist Headquarters in budget documentation writing.
- 2-4 - John Hunter traveled to Newport, Oregon, to lecture and consult at the Cooperative Institute for Marine Resources Studies, Oregon State University.
- 3-4 - Dan Huppert hosted a meeting of the NMFS Economics Steering Committee in La Jolla. Attending the meeting were Dr. R. Marasco (NWAFC), M. Miller (Washington, DC), P. Kurkul (NER), and J. Poffenburger (SEFC).
- 5-14 - Gail Theilacker traveled to Vancouver, British Columbia, Canada, to make a presentation at the 8th Annual Larval Fish Conference.
- 6-12 - Geoffrey Moser attended the 8th Annual Larval Fish Conference in Vancouver, British Columbia, Canada.
- 7-9 - Doug DeMaster traveled to Washington, DC, to discuss an Antarctic review paper with the working group.
- 7-10 - Director Izadore Barrett attended a NMFS Research Council meeting at Newport, Rhode Island.
- 7-11 - Richard Methot attended the North Pacific Workshop on Invertebrate Stock Assessment and Management, Nanaimo, British Columbia, Canada.
- 8-9 - Michael Laurs traveled to Monterey, California, to prepare documents for the albacore strategic plan with PEG staff.

- 13-14 - Director Izadore Barrett visited Tiburon and Monterey, California, to review Merit Pay Plans.
- John Carr traveled to Anaheim, California, to attend a computer graphics briefing.
- Fred Kellenberger attended the National Computer Graphics '84 Conference in Anaheim, California.
- 17 - Dan Huppert, Alec MacCall, and Richard Methot traveled to San Francisco, California, to discuss the Groundfish Research Plan with Tiburon scientists.
- 20-22 - Michael Laurs, Steven Reilly, Hanna Bernard, and John Hedgepeth attended the 35th Annual Tuna Conference at Lake Arrowhead, California.
- 20-23 - Director Izadore Barrett, John Carr, Andrew Dizon, John Graves, Jay Barlow, Aleta Hohn, Pierre Kleiber, Gary Sakagawa, and Susan Chivers traveled to Lake Arrowhead, California, for the 35th Annual Tuna Conference.
- Doug DeMaster went to Washington, DC, to review a proposal on California marine mammals and oil contamination.
- 21-23 - Sam Herrick, Norman Bartoo, Christina Show, Anthony Majors, Atilio Coan, James Squire, Earl Weber, John Hunter, and Lisa Ankenbrandt attended the 35th Annual Tuna Conference at Lake Arrowhead, California.
- 22-25 - Wayne Perryman visited Santa Barbara, California, to review performance of contractor, view aerial imagery, test image interpretation techniques, and plan a summer survey.
- May 24- - William Perrin traveled to Eastbourne and London, England,
June 13 to participate in a meeting of the International Whaling Commission (IWC) Science Committee and to serve as a rapporteur for the small cetaceans sub-committee.
- 28-29 - Alec MacCall presented a paper at the annual meeting of the American Association for the Advancement of Science in New York City, New York.

Pacific Environmental Group

- May 15 - Dr. Roy Mendelssohn attended the ORSA/TIMS (Operations Research Society of America-The Institute of Management Science) meeting in San Francisco, California, and presented a paper.

- 20-21 - Dr. Roy Mendelssohn presented a paper at the Tuna Conference at Lake Arrowhead, California.
- 20-22 - Dave Husby attended the Tuna Conference at Lake Arrowhead, California.
- 20-25 - Paul Sund attended the Tuna Conference at Lake Arrowhead, California, and gave a paper and presented a poster. He also traveled to SWFC to consult with staff members.
- 23 - Dr. Roy Mendelssohn traveled to Berkeley, California, to the U.S. Forest Service to do some inter-agency consulting on computer problems.
- 24-30 - Andy Bakun chaired a session of the AAAS meeting in New York City, New York, and presented a paper.

Tiburon Laboratory

- May 1-13 - Bill Leet, Sennen Salapare and Sus Kato traveled to San Diego, California, to participate in David Starr Jordan Cruise DS-84-04(175).
- 3 - Dr. Edmund Hobson presented a seminar on the structure of fish communities at UC/Davis.
- 14-15 - Sus Kato attended a meeting in La Jolla on squid assessment.
- 17 - Dr. Bill Lenarz, Norm Abramson and Mickey Eldridge attended a meeting of the SWFC groundfish research planning group.
- 22 - Ed Ueber attended a Sea Grant Advisors meeting in San Francisco, California.

Personnel

Honolulu Laboratory

- May 6 - Robert J. Morrow, Biological Technician (Wildlife) - Full-Time, Temporary Appointment.
- 13 - Daniel R. Locey, Computer Science Student Trainee (Jr. Fellow) - Return to Duty and Promotion.
- 15 - Rodney T. Watson, Biological Technician (Wildlife) - Conversion to Full-Time, Temporary Appointment.

- Robert O. Mendelsohn, Industry Economist - Full-Time, Temporary Appointment (Faculty Fellowship Program).
- Todd T. Kassman, Computer Clerk - Extension of Temporary Appointment.
- 21 - Theresa Villanueva, Biological Science Student Trainee (Jr. Fellow) - Return to Duty.
- 27 - Theresa Villanueva, Biological Science Student Trainee (Jr. Fellow) - Promotion.
- Miriam B. Pillos, Biological Science Student Trainee (Jr. Fellow) - Return to Duty and Promotion.

La Jolla Laboratory

- May 4 - Sandor Kaupp, Biological Technician - Entered on Duty.
- Harold Wordlaw, Clerk-Typist - Separation.
- 7 - Vincent Mazzarella, Clerk - Entered on Duty.
- 11 - George Graham, Clerk-Typist - Resignation.
- Tod Foster, Fishery Biologist - Resignation.
- 13 - James Gilpatrick, Biological Technician - Promotion.
- Thomas Tumosa, Biological Technician - Conversion to Full-Time Permanent.
- Mark Lowry, Fishery Biologist - Conversion to Full-Time Permanent.
- Larry Hansen, Wildlife Biologist - Conversion to Full-Time Permanent.
- James Gilpatrick, Biological Technician - Conversion to Full-Time Permanent.
- 14 - Ronald Whyte, Cash and Attendance Clerk - Entered on Duty.
- 18 - Victorio Gorospe, Biological Technician - Expiration of Appointment.
- 21 - Helen Becker, Editorial Assistant - Resignation.
- Michael Burchianti, Computer Clerk - Entered on Duty.

- 25 - Louis Arnell, Biological Technician - Resignation.
- 27 - Lorna Marquez, Accounting and Budget Technician - Promotion.
- William Perrin, Fishery Biologist - Promotion.
- 29 - Anthony Sarain, Computer Clerk - Entered on Duty.

Tiburon Laboratory

- May 1 - Lt. Fredric R. Plotkin, NOAA Corps - Promotion.
- 13 - William H. Lenarz, Fishery Biologist (Research) - Placement in Duty Status.
- Susan Logan, Biological Aid (Fisheries) - Return to Duty.
- 27 - Norma Smith, Clerk-Typist - Conversion to Part-Time Permanent.

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